REMARKS

Claims 1, 8, 9 and 18 are amended. No claims are added or canceled. Hence, Claims 1-25 are pending in the Application.

I. INFORMATION DISCLOSURE STATEMENTS NOT INITIALED

The Examiner has not initialed the Information Disclosure Statements submitted on September 20, 2007, June 18, 2008, July 3, 2008, and September 24, 2008. Applicant respectfully requests that the submitted references be considered and that the Examiner return an initialed copy of the IDSs with the next communication.

II. ISSUES NOT RELATING TO CITED ART

A. Claim 18 – 35 U.S.C. § 101

Claim 18 is rejected under 35 U.S.C. § 101 as allegedly directed to non-statutory subject matter. Present Claim 18 is free of this issue. Reconsideration and removal of the rejection is respectfully requested.

B. Claim 9 – 35 U.S.C. § 112

Claim 9 is rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action asserts that the feature "receiving a backward ant data packet that indicates a second amount of time taken for the forward ant data packet to travel to the specified destination," and argues that "[i]t is unclear **how** the travel time of a backward ant data packet **could** indicate the travel time of forward ant data packet." The rejection is respectfully traversed.

A skilled person would have no conceivable difficulty in understanding 1) "receiving a backward ant data packet" and 2) "that data packet indicates a second amount of time taken for the forward ant data packet to travel to the specified

destination," as recited, in light of the specification, for example, at paragraphs 30, 36 and 38. The backward ant data packet is sent backward in the network, but carries data developed as the forward ant packet traversed.

For at least the reasons given, Claim 18 is not indefinite under 35 U.S.C. § 112, second paragraph. Reconsideration and removal of the rejection is respectfully requested.

III. ISSUES RELATING TO CITED ART

A. 35 U.S.C. § 103(a) —*TERUHI* AND *RFC 2676*

Claims 1-7 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Teruhi et al., U.S. Pub. No. 2003/0072269 (hereinafter *Teruhi*) in view of Apostolopoulos et al., INTF RFC 2676 "QoS Routing Mechanisms and OSPF Extensions", August 1999 (hereinafter *RFC 2676*). The rejection is respectfully traversed.

Independent Claim 1

Claim 1 at least recites:

selecting, from a set of routers, a particular router that is associated with a first actual time that is a shortest time among all times associated with routers in the set of routers;
wherein the first actual time has been updated with a previous actual time taken for a previous data packet to travel to a previous destination indicated by the previous data packet;
sending a first data packet to the particular router;
receiving a second data packet that indicates a second actual time taken for the first data packet to travel to a destination indicated by the first data packet;
wherein the destination indicated by the first data packet is the same as the previous destination indicated by the previous data packet;
wherein the second data packet is sent from the destination indicated by the first data packet;
updating the first actual time based on the second actual time; and
updating the routing table based on information contained in the second data packet;

The combination as suggested by the Office Action fails to provide all the elements of Claim 1.

The Office Action Fails to Consider the Claim Language

"All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). Claim 1 recites "selecting, from a set of routers, a particular router that is associated with a first actual time that is a **shortest time** among all times associated with routers in the set of routers ... wherein **the first actual time** has been updated with **a previous actual time taken for a previous data packet to travel to a previous destination indicated by the previous data packet**."

A combination of the cited references fails to show a particular router that is associated with an actual time taken for a previous data packet to travel to a previous destination indicated by the previous data packets. In addition, the combination of the references fails to show that this actual time is a shortest time among all times associated with the routers.

The Office Action appears to ignore the recited features of Claim 1. Instead, the Office Action addresses the unclaimed alternative language of "selecting, from a set of routers, a particular router that is associated with a first actual path is a shortest path among all paths associated with routers in the set of routers", "wherein the first actual path has been updated with a previous actual path taken for a previous data packet to travel to a previous destination indicated by the previous data packet." These phrases upon which the examination was performed do not appear in Claim 1.

The Office Action also creates its own claim language to examine. For example, the Office Action substitutes the claim term "actual time for a data packet to travel to a

destination" with "an actual path," which does not appear in Claim 1. This substitution is improper, as the Office Action has not provided any evidence to indicate that "an actual path" is a time, much less a first actual time that is taken for a previous data packet to travel to a previous destination indicated by the previous data packets.

The References Cited by the Office Action Fail to Support the Rejection

A path is a spatial quantity while a time is a temporal quantity. Calling a path in OSPF routing protocol an "actual" path does not change the fact that a path of OSPF is a logical distance between routers in units of hops. A spatial quantity such as a path and a temporal quantity such as the recited actual time describe different, unrelated things. In order for a path to be translated into a time, a speed or a rate at least must be known. As a simple analogy, a lifespan of a person is not the same as a distance over which the person travels, unless a speed or a rate is known.

OSPF as described by *RFC2676* is based on the concept of a path. A path comprises a plurality of links, with various speeds and throughputs that potentially vary in real time based on network conditions. Unless all times spent on all parts of a path are known, an actual time for a packet to travel the path cannot be known. Based on the record in this case, there is neither a need nor a disclosure in *RFC2676* to set up routes based on time, much less actual time. There is also neither a need nor a disclosure in *RFC2676* to compute an actual time based on actual times spent on links that comprise the path.

Teruhi, on the other hand, is a system that runs OSPF and measures quality of routes between a **source** node and a **destination** node. Each of these routes between the source node and the destination node comprises **a plurality of links**, speeds or rates of which are unknown and non-measurable by either the source node or the destination

node. Just as in *RFC2676*, there is neither a need nor a disclosure in *Teruhi* that routes now are based on actual times or a shortest time thereof.

For at least these reasons, a path is not equivalent to an actual time. The alternative language the Office Action examines is thus not equivalent to the claim language of Claim 1.

The Office Action argues that *Teruhi* at paragraph 7 discloses "wherein **the first actual time** has been updated with **a previous actual time taken for a previous data packet to travel to a previous destination indicated by the previous data packet**." The cited excerpt reads in its entirety as follows:

> [0007] In Japanese Patent Application Laid-Open Gazette No. 2000-216817 there is described a system in which each router on the network monitors the traffic state on the transmission line and, when traffic concentration exceeding the premeasured throughput of a route, switches the route to another as a detour. However, this method requires premeasuring the throughput of each route and generating a routing table of every router on the network on the basis of the premeasured throughputs; hence, this method is impractical.

As can be seen, this excerpt only states that throughput is used to generate routes. Throughput pertains to a size of a communication channel. That is, throughput measures an amount of information that may be transmitted through the communication channel per unit time. Throughput is generally known to be measured in a unit time such as a second. The times in throughputs are thus fixed to a unit time in order to meaningfully compare different throughputs. Throughput simply is not an actual time, contrary to the argument of the Office Action.

The Office Action asserts that *RFC 2676* at Section 1.2 page 5 line 8 "teaches the shortest path in terms of traveling time." Respectfully, this is incorrect. Rather, the excerpt in *RFC 2676* reads "Specifically, the extension to LSAs that we initially consider, include only available bandwidth and delay." This citation only states a protocol packet

of OSPF may carry an extension that includes delay. This citation plainly does not state that in OSPF a selected route is associated with an actual time that is the shortest among the times.

As is well known in the art, and as conceded by the Office Action, OSPF selects routes based on path information. That is, in OSFP, the shortest path, not a shortest time, is used to select a route. The excerpt in *RFC 2676* only states that LSA packets include available bandwidth and delay information. Nothing in this excerpt states that a shortest path is associated with the delay in the LSAs. There is neither a disclosure nor a need in *RFC2676* that an LSA carries indications of actual times. Furthermore, there is neither a disclosure nor a need in *RFC2676* that a selected route is associated with an actual time that is the shortest among the times.

The Office Action asserts that in *Teruhi* "the time between the first RTCP-RR packet is sent from Node 12 and the time it arrives at Node 11, FIG. 9, as disclosed by Section 6.3.2 in page 28 of RFC1889." Respectfully, this assertion is incorrect.

The Office Action misapprehends the *Teruhi* reference. Specifically, "the time between the first RTCP-RR packet is sent from Node 12 and the time it arrives at Node 11" is not in the specification or FIG. 9 of *Teruhi*. The Office Action simply looks at FIG. 9, identifies two points from that figure, and infers anonymous time between these two points from the figure. The Office Action further alleges that this anonymous time is included in the RTCP-RR packet because of RFC 1889.

Section 6.3.2 of RFC1889 describes a format of RTCP-RR packet. There is no description on that page of RFC1889 for the alleged time mentioned in a separate reference, i.e., *Teruhi*. The assertion that "the time between the first RTCP-RR packet is sent from Node 12 and the time it arrives at Node 11" is described on page 28 of RFC

1889, a document separate from *Teruhi*, is incorrect. Indeed, if *Teruhi* places in the RTCP-RR packet "the time between the first RTCP-RR packet is sent from Node 12 and the time it arrives at Node 11," one would expect *Teruhi* to specifically give a name or a label for such a time. Here, the Office Action has to call out an anonymous time unmentioned in *Teruhi* and allege that this time is in the RTCP-RR packet because of RFC 1889. The assertion cannot possibly establish that the references in fact place that time in the RTCP-RR packet.

The Office previously mistook DLSR 74 of *Teruhi* as an actual time, as noted in the attachment to the pre-appeal review request and Applicant's previous responses and as already conceded by the Office. The Office Action appears to revive this mistaken argument here; but this time simply creates its own label as "the time between the first RTCP-RR packet is sent from Node 12 and the time it arrives at Node 11" instead of DLSR74. However, as can be seen from *Teruhi*, the response report, i.e., RTCP-RR, does not report an actual time travel by a forward packet to a destination to the source node.

The Office Action asserts that "RFC2676 teaches finding the shortest path ... in terms of traveling time" because *RFC2676* at paragraph 2 on page 12 states that "the QoS routing table that gets built as the algorithm progresses ... at each (hop count) iteration, intermediate results are recorded in a QoS routing table" and because *RFC2676* at section 3.2, second paragraph, on page 18 states that an OSPF hello packet carries a TOS parameter including "minimize delay." Respectfully, the Office Action's assertion is incorrect.

RFC2676 at paragraph 2 on page 12 describes the algorithm used in computing routes in OSPF. As is well known, that algorithm is an iterative one. The Office Action

confuses intermediate results of an iterative algorithm in *RFC2676* with "all times associated with routers in the set of routers" in Claim 1. However, this citation is devoid of any mention of time, much less an actual time or a shortest time, or a router associated with an actual time, as claimed.

RFC2676 at section 3.2, second paragraph, on page 18 describes a field in an OSPF Hello packet to indicate a router's capability. That field is a 4-bit constant flag value indicating an intrinsic **property of the router** and has nothing to do with an actual time for a packet to travel to a destination.

These citations are devoid of any mention of time, much less an actual time or a shortest time, or a router associated with an actual time, as claimed.

The Office Action asserts that "the shortest time is never defined or mentioned in Specification." Respectfully, this is incorrect for three reasons.

First, "the shortest time" has a well-understood meaning in plain English. Second, Applicant's specification, for example, describes that "[t]he present router determines from the backward ant if the time taken by the corresponding forward ant to reach the destination through the previous router is the **lowest** of the pheromone table's predicted times to reach the destination through any of the present router's neighboring routers. If so, then the present router also determines if the backward ant's path feasibility flag indicates that the corresponding forward ant's path is feasible. If so, then the present router further determines if any of the routers along the corresponding forward ant's path between and including the present router and the destination are identified in the potential upstream node list associated with the destination. If not, then the present router **updates the present router's routing table to indicate that data packets addressed to the destination are to be forwarded to the previous router**."

See paragraph 42. This paragraph shows that the lowest time, or the shortest time, is used in a decision to update the routing table to indicate that data packets **addressed to the destination are to be forwarded to the previous router**." Third, the shortest time has been recited since the originally filed claims. Thus, the term "the shortest time" is clearly supported by the specification and the originally filed claims. For these reasons, the Office Action's assertion that the shortest time is undefined is incorrect.

For at least the reasons given above, Claim 1 is patentable over *Teruhi* and *RFC 2676*. Reconsideration is respectfully requested.

Claims 2-7

Claims 2-7 are dependent upon and thus include each and every feature of Claim 1 discussed above. Therefore, Claims 2-7 are allowable for at least the reasons given above with respect to Claim 1. Reconsideration is respectfully requested.

B. 35 U.S.C. § 103(a) —*RFC 1247* AND *RFC 2676*

Claims 8 and 18-20 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over and J. Moy et al., IETF RFC 1247 "OSPF Version 2", July 1991 (hereinafter *RFC 1247*) in view of *RFC 2676*. The rejection is respectfully traversed.

Claims 8 and 18-20 each recite similar features as those discussed above with respect to Claim 1. *Moy* fails to disclose the features of Claim 1 that are missing in *RFC 2676*. Therefore, Claims 8 and 18-20 are patentable for at least the same reasons discussed above as to Claim 1. Reconsideration is respectfully requested.

C. 35 U.S.C. § 103(a) —*CARO* AND *RFC 2676*

Claims 1-25 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over Gianni Di Caro et al., "AntNet: Distributed Stigmergetic Control for Communications Networks", Journal of Artificial Intelligence Research, 12/1998 (hereinafter *Caro*) in

view of *RFC 2676*. The rejection is respectfully traversed.

Caro fails to disclose a number of features in Claim 1. For example, Claim 1 recites "selecting, from a set of routers, a particular router that is associated with a first actual time that is a shortest time among all times associated with routers in the set of routers, **wherein the first actual time has been updated with a previous actual time taken for a previous data packet to travel to a previous destination indicated by the previous data packet**" (emphasis added). On the other hand, *Caro* only discloses selecting a neighbor based on **probabilistic values** stored in the routing table. There is no disclosure in *Caro* that the probabilistic values are a previous actual time taken for a previous data packet to travel to a previous destination indicated by the previous data packet, as featured in Claim 1. Indeed, since *Caro* selects a neighbor based on probabilistic values, a shortest path in *Caro* cannot have 100% probability, as that would mean the selection would be deterministic, rather than probabilistic. A deterministic approach is clearly against the operating principle of *Caro*.

The Office Action correctly concedes that *Caro* (which the Office Action inadvertently refers to as "Teruhi") "**is silent on** the criterion is that the first packet is predicted to reach the destination in a shortest time (the first time)." However, the Office Action states that "[i]n the same field of endeavor, RFC 2676 further teaches routing the shortest path in terms of traveling time (delay, line 8 of first paragraph in Section 1.2, Page 5)."

Respectfully, as previously discussed with respect to the 103 rejection involving *RFC 2676*, there is no disclosure in *RFC 2676* for selecting, from a set of routers, a particular router that is associated with a first actual time that is a shortest time among all times associated with routers in the set of routers, **wherein the first actual time has**

been updated with a previous actual time taken for a previous data packet to travel to a previous destination indicated by the previous data packet, as featured in Claim 1.

Further, a combination of the two references conflicts with the teaching of at least one of the references, and violates at least one principle of operation of the references.

A probabilistic model is fundamental to the operation of *Caro*. As described in the reference, all the steps, generating packets, selecting neighbor nodes to forward, updating routing information, etc., are all inextricably tied to the probabilistic model. For example, as *Caro* indicates on page 328 (item 7.i), "[t]he **statistical model** has to be able to capture this variability and to follow in a robust way the fluctuations of the traffic. **This model plays a critical role** in the routing table updating process (see item (ii) below)" (emphasis added). Furthermore, according to *Caro*, routing performance is improved under the AntNet because of the use of probabilistic entries (on page 330, "**The use of probabilistic entries is very specific to AntNet** and we observed it to be **effective**, improving the performance, in some cases, even by 30%-40%. Routing tables are used in **a probabilistic way not only** by the ants **but also** by the data packets. This **has been observed to improve** AntNet performance, which means that the way the routing tables are built in AntNet is **well matched with a probabilistic distribution** of the data packets over all the good paths" (emphasis added)).

A combination of *RFC 2676* and *Caro*, as suggested by the Office Action, would completely vitiate the advantages gained by the probabilistic model of *Caro*, rendering the critical role played by the probabilistic model in *Caro* unfulfilled.

Thus, under this proposed combination as asserted by the Office Action, *Caro* and *RFC 2676* must be integrated in such a manner that the probabilistic route selection in

Caro is replaced with selecting a neighbor router that has a lowest amount of delay time from source node to the destination node in searching the best routing. As a result, *Caro*'s critical probabilistic model including selecting routers based on probabilistic values must be replaced in this proposed combination and its operating principle violated.

The Office Action asserts that in *Caro*, the "routing table is built or updated, a shortest path can be found between any two nodes, which does not violate Caro's critical probabilistic model in any way because Caro's model is used in **building** or **updating** the routing table, **not in finding** the shortest path." Respectfully, this is incorrect.

Caro's data model is probabilistic. As shown in FIG. 1 on page 325, a network node maintains a routing table and a local traffic statistics table. *Caro*'s probabilistic information, i.e., the local traffic statistics table, only stores means and variances, as indicated by expression (1) on page 326. The actual time of a data packet is only used to compute the means and variances in expression (1). Only the computed statistical results are stored in the local traffic statistics table. There is neither a need nor a disclosure in *Caro* to store actual times of any data packets, as argued by the Office Action. The means and variances in *Caro*'s probabilistic information cannot be used to find a router associated with an actual time for a data packet to travel to a destination, as explicitly claimed.

For at least these reasons, Claim 1 is patentable over *Carol* and *RFC 2676*. Reconsideration is respectfully requested.

Claims 8, 9 and 18-20

Claims 8, 9 and 18-20 each recite similar features as those discussed above with respect to Claim 1. For example, Claim 18 is a computer-readable medium claim that corresponds to method Claim 1. Claim 19 is recited in a format allowable by 35 USC

§112, and corresponds to method Claim 1 discussed above. Claim 20 is an apparatus claim that corresponds to method Claim 1. Therefore, Claims 8, 9 and 18-20 are patentable for at least the same reasons discussed above as to Claim 1. Reconsideration is respectfully requested.

Claims 2-7, 10-17 and 21-25

Claims 2-7, 10-17 and 21-25 are dependent upon and thus include each and every feature of Claim 1 discussed above. Therefore, it is respectfully submitted that Claims 2-7, 10-17 and 21-25 are allowable for at least the reasons given above with respect to Claim 1.

IV. CONCLUSION

For the reasons set forth above, Applicant respectfully submits that all pending claims are patentable over the art of record, including the art cited but not applied. Accordingly, allowance of all claims is hereby respectfully solicited.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Respectfully submitted,

HICKMAN PALERMO TRUONG & BECKER LLP

Dated: November 30, 2009

/ZhichongGu#56543/
Zhichong Gu
Reg. No. 56,543

2055 Gateway Place, Suite 550
San Jose, CA 95110
Telephone No.: (408) 414-1080
Facsimile No.: (408) 414-1076